

in the face. Similarly, the average politician and the ordinary elector, having but little knowledge of philosophical experiments, or faith in them, will probably not believe in their great practical value until national distress and panic legislation ensue. The love of money also, and the desire of acquiring it quickly without commensurate sacrifice, fostered by our having so easily obtained it by means of our coal and science, is so strong in this nation, that probably nothing but the actual loss of wealth in the form of diminished value of properties, will induce capitalists and land-owners to perceive and examine the scientific basis of their incomes. When, however, the stern reality of gradually increasing scarcity of coal, and consequent inability to pay for our great supplies of foreign food by means of that coal, and of articles produced by its aid, comes upon us, perhaps the statesmen and wealthy classes of this country will see the indispensable necessity of new scientific knowledge, and be more ready to promote experimental research, with a conviction that its practical results are vast, though not always direct or immediate.

G. GORE

MAMMALIAN DESCENT

On Mammalian Descent; the Hunterian Lectures for 1884. By W. Kitchen Parker, F.R.S. (London: Griffin and Co., 1885.)

AS far as we are aware, no attempt has hitherto been made to popularise in any detail the science of comparative embryology. It is therefore indicative of the characteristic originality of Prof. Parker that, on delivering a course of Hunterian lectures upon the embryology of the Mammalia, he should have aimed at charming a popular audience as well as at instructing a scientific one. We confess that upon reading the first paragraphs of his preface, in which he states his intention of handling his subject in a popular way, we felt apprehensive that, like sundry other lecturers with a similar aim and with subjects better suited to the killing of two birds with one stone, he was preparing for himself the misfortune of missing both his marks. But we had not got far into the first lecture without finding that our lecturer very well knew what he was about : he is provided with a double-shot weapon of the most modern construction, and takes a genuine glee in knocking over some antediluvian tooth-bearing bird on the one side, and the sentimental scruples of a nineteenth-century audience upon the other. And this is done with so much of the vigour of enthusiastic science, as well as the genuine feeling of what we may term unspoiled poetry, that we feel our thanks are due to Miss Arabella Buckley who, it seems, first persuaded Prof. Parker to adopt this delightful method of writing. Moreover, it is obviously to him a natural method. We can everywhere see that he is now writing in the lines of his habitual thinking. The smallest details of his science catch a living glow from the ardour of his imagination, and as this imagination is everywhere charged with biblical thoughts and biblical metaphors, we are led by the force of example to compare it to some quickening spirit which makes all the dry bones of the skulls and skeletons stand up around him as an exceeding great army. Well it is for the cause of evolution that in Prof. Parker it has not only so indefatigable a worker, but likewise so ele-

vated a preacher ; and being thus as strong a champion on the side of sentiment as he is on that of science, we have only to congratulate him upon the wisdom of adopting Miss Buckley's advice, and appearing in the lists armed with the weapons of feeling as effectually as with those of fact.

The course consists of nine lectures, and there are, besides, extensive addenda. In the 229 pages to which the book runs, we have presented an excellent epitome of the author's work on the embryology of the Mammalia. The perusal of this epitome cannot fail to strike us anew with admiration at the prodigious amount of his labours, and the great results which they have accomplished. When future generations come to survey the work done by the contemporaries of Charles Darwin in establishing the doctrine of evolution, and in beginning the great task of tracing out the main lines of descent in the animal kingdom, the name of Parker will stand out as one of the most conspicuous of the landmarks.

Two or three quotations from the present volume will serve to convey a general idea of the style, upon which we have laid so much stress. Speaking of a remarkable proboscidian Insectivore, about the size of a rat (*Rhyncho-cyon cernei*), a ripe embryo of which he has obtained from near Zanzibar, the lecturer says :—

"I have, at present, merely worked out the skull of this valued specimen, but it has rewarded and delighted me more than any kind I have received for a long time past. If nature had titubated together the germs of four or five types of mammals, and had then made this mixture grow, she could scarcely have developed a more curious and composite creature than this long-nosed Insectivore. When Prof. Huxley propounded his oft-quoted theory of the evolution of the Mammalia, he might have known the structure and development of this type by inward sight. Nothing of the kind, however, is ever revealed to biologists in this manner, we only get our facts by opening out the fine folds of organic forms with needle and scissors ; we do unroll a good number of the small scrolls, but it is painful and patient work. I am satisfied that no searcher after the evidences of evolution ever saw anything more instructive than what I have found in this small beast. I will make a catalogue of its characters. . . . Thus this greatly specialised kind of Insectivore, whilst retaining the most marked characteristics of the Metatherian skull, takes on two characters, one of which, had it become dominant, would have landed it amongst the Proboscidea, or elephants, whilst the other would have made it a Carnivore. It attempted too much at once, and thus, like a man in doubt, it made but little progress ; moreover, in this developmental shilly-shallying, it failed to drop the Marsupial, to take on the new Eutherian, nature, and was thus in danger of going out of being with many of the members of that much-extinguished type. Other types, not thus confused in their ambition, worked out the old strain of Metatherian degradation, and, taking to one definite line of ascent, put on new specialisations in harmony with their surroundings, and to this day their descendants are the rulers of the forest and the field."

Again :—

"Supposing the theory of the slow secular transformation of the old general types into new special types to be true, then the existing mole, in its perfection of adaptive structure, has been as long in coming to its present perfection as the larger and nobler prone or erect types that trample the earth over its head. In its own line, doing its own dark work, it is as complete a creature as the clear-eyed, super-terrestrial types ; as a mole, it is con-

summate—a complete and perfect example of a subterranean tyrant ; all around him are hosts of juicy grubs and worms, and thereout sucks he no small advantage. Concerning tastes there is no disputing : one naturalist is fond of whales, another of moles, shrews, and mice. All these amusing types must have their supply of food ; the great mother, Nature, loves all, and shakes out of her lap plenty for every kind. When we reflect that our country possesses about 1200 species of insects, and that some of the species are prolific beyond all calculation, then we come to understand how the higher insectivorous tribes—birds or small mammals—find so plentiful a table in the wilderness. The hungry, impatient cat, who mistakes a shrew for a mouse, and then leaves her musky prey untasted, would starve upon that which fattens the mole, the shrew, or the bat. The last of these kinds hawks for his small prey, but the shrew, with his delicate proboscis, his sharp eyes, and his quick ears, knows where small beetles most do congregate. These he crunches and munches with exquisite teeth, the cusps or points of which are of a deep ferruginous red colour, more beautiful, strange to say, because they are thus stained. The Power that made the beetle strong in his polished and enamelled armour made also the teeth of the shrew most fit instruments for crushing that armour in which the beetle trusts. It is pleasanter to look upon this vacillation, so to speak, of beneficent purpose from the stand-point of a Darwin than from the stand-point of a Paley ; there is much that is painfully mysterious in the whole matter, and we only see it in a partial view."

The lectures concludes thus :—

"When the eyes of the prophet's servant were opened he saw no longer barren rocks with mist resting upon them, but the whole mountain was full of chariots of fire and horses of fire. The vestments and ritual of nature may take up all the attention and use up all the energies of her votaries ; these superficial observers fail, however, to find the real religion of nature—the beautiful but awful omnipresence which every flower and every insect reveals. The phenomena of nature are all mere fading pageants, and the really cultivated mind finds lasting satisfaction in meditating upon the recognisable forces that underlie all sensible phenomena.

"This, however, is what the older philosophers called 'dry light' and is not comfortable to most minds. The deeper things of nature are a sort of manna, but the souls of some people become dried up if you give them merely this celestial kind of diet ; so that they murmur and say, 'We remember the fish which we did eat in Egypt, freely ; the cucumbers, and the melons, and the leeks, and the onions, and the garlic.'

"And yet this ignorance of nature is set up as a dead wall against all progress of thought ; for these people are 'most ignorant of what they're most assured,' certain that they know all about their 'glassy essence' ; and, although as blind as moles, they are the enemies of all who have had their eyes opened, to whom the mountain is no longer misty and dark, but flaming with light.

"*'Ne sutor supra crepidam'*—do not trust the cobbler in things outside his calling—is a proverb that cuts both ways. The biologist may surely be allowed to know things that relate to his own calling : the man who never dreams of life, and the science of life, should be careful how he contradicts its experts. On the other hand, bigotry is not confined to one class of controversialists ; some very bitter things have been said by men against faith whose culture and science ought to have taught them better. We have a right to look for nothing but 'sweetness and light' from the apostles and prophets of this new dispensation.

"When the dust of controversy shall have subsided, when those who have to receive new ideas as if by a surgical operation begin to feel the stirrings of these new

conceptions thus let into them—the new heaven of nobler thoughts about nature, and of the great First Cause of nature—then all who can think will find that they are colonising a new Atlantis.

"The old song of the creation puts it thus—Evening was—morning was—day one.

"Thus the shadows of the evening came first, and the rosy light of dawn afterwards. Now, in science, even in biological science, the morning is spread upon the mountains, and soaring birds are singing at heaven's gate ; so that the drowsiest folk are beginning to stir themselves ere well awake."

We have selected these examples for quotation in order to recommend the book to the class of readers for whom it is primarily intended ; but we must not conclude without again observing that the lectures contain so much solid information of the strictly scientific kind, that even the most bigoted of biological experts cannot afford to disregard the material mountain, however little heed they may care to give to the vision of the fiery chariots.

GEORGE J. ROMANES

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

Civilisation and Eyesight

IN reading Lord Rayleigh's interesting remarks in NATURE (p. 340) upon Mr. Carter's paper, it has occurred to me that we should not, in considering the question of "aperture," entirely omit the fact that this, though probably following a general rule applicable alike to savages and civilised beings, varies in individual cases. An assistant, who has recently left my observatory, had a singularly "sharp" eye, and could pick up with ease companions to double stars, small satellites, &c., which others saw with difficulty. Such were his powers in this respect that I always appealed to him in the case of a doubtful observation. I noticed one day how large the pupils of his eyes were, so large that I asked him if he had taken anything to artificially dilate them. Subsequent examination proved that they were, though of course varying with the stimulus of light, always much larger than those of most other persons, so much so that I laughingly used to call them "cat's eyes." They had also, in fact, a peculiarity, attributed to feline sight, that he could read fine print and distinguish lines by a light much less bright than I could, and habitually used the gas half turned on, &c. Probably such instances would not be rare if they were looked for. Another question arises on this head : Could it be possible that such a condition of the eye, natural in some persons, could, by certain uses of the member, be fostered in others ?

I should not have ventured the suggestion but for having read of the "chamois" eye, by which the habitual, or even casual, Alpine hunter can be recognised. I have no references at hand, and it may be it was the look, and not the eye itself, that gave rise to the cognomen ; but if there was any change in the eye-conditions, and especially in that of aperture, we might find a reason why the far-gazing savage improves the power of the eye by use. We know that by certain trades—watch-making, for instance—these conditions are varied adversely to long sight, and in the case of sailors and preventive service men a contrary effect seems induced. Lord Rayleigh thinks that the superiority of the savage is only a question of attention and interpretation of minute details, but when one reads that two distant dots are resolved into distinctly-appreciable personages as regards sex, garments, &c., one begins to suspect that "aperture" must also come into play. At all events an inquiry whether these far-seeing savages have large eye apertures might help the solution of the matter.

The peculiarity affecting my assistant's eyes may be more